

# Work Order ID 89903

September-12-12 11:39:46 AM

\*89903\*

RELEASED DRAWINGS  
PRELIMINARY ISSUE ATTACHED

Page 1

Item ID: D4709-1

Accept

\*N900040100\*

Setup Start

\*NS1\*

Revision ID: PRELIM

Item Name: Spring Clip

Stop

\*NS2\*

Start Date: 9/12/12 Start Qty: 25.00

\*25\*

Cust Item ID:

Required Date: 9/28/12 Req'd Qty: 25.00

\*25\*

Customer:

Reference:

Approvals:

Process Plan: ✓

Date:

Tooling:

Date:

Run

Start

\*NR1\*

QC:

Date:

SPC (Y/N):

Date:

Stop

\*NR2\*

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

Draw Nbr

Revision Nbr

D4709

110

0.00

\*110\*

Purchasing

Memo

0.00

Purchasing

Issue P/O: 17895

Manufacture as per dwg

Possible supplier: GFI

Material release note is required.

CY 12/09/12 (25)

120

Receive & Inspect for Damage & Mat'l Certs

0.00

\*120\*

Packaging

Memo

0.00

Packaging

Pur 10/10/12 (25)

130

QC6- Inspect dimensions to drawing

0.00

\*130\*

QC

Memo

0.00

Quality Control

inspected by PA1  
DAS only  
DAS 16  
17/10/12

conts  
(25)

NCR: Yes / No

**WORK ORDER NON-CONFORMANCE / UPDATE**

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____  Part No. _____  NCR No. _____	<b>DISPOSITION</b>  Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/> Work Order Update <input type="checkbox"/>	<b>AGAINST DEPARTMENT/PROCESS</b>  <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">Skid-tube <input type="checkbox"/></td> <td style="width: 33%;">Crosstube <input type="checkbox"/></td> <td style="width: 33%;">Water Jet <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> </tr> </table> <table style="width: 100%; border: none; margin-top: 10px;"> <tr> <td style="width: 33%;">Engineering <input type="checkbox"/></td> <td style="width: 33%;">Quality <input type="checkbox"/></td> <td style="width: 33%;">Other <input type="checkbox"/></td> </tr> </table>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coord. <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>	Engineering <input type="checkbox"/>	Quality <input type="checkbox"/>	Other <input type="checkbox"/>
Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>															
Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coord. <input type="checkbox"/>															
Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>															
Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>															
Engineering <input type="checkbox"/>	Quality <input type="checkbox"/>	Other <input type="checkbox"/>															

Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Doc/Data									
Equip/Tooling									
Operator									
Material									
Setup									
Other									
Process									
Supplier									
Training									
Unapproved									

**FAULT CATEGORY**

Landing Gear	General	Other
<input type="checkbox"/> Bending	<input type="checkbox"/> Bend	<input type="checkbox"/> Grain
<input type="checkbox"/> Centre Not Concentric to O/S	<input type="checkbox"/> BOM/Route	<input type="checkbox"/> Hardware
<input type="checkbox"/> Cracks	<input type="checkbox"/> Broken/Damaged	<input type="checkbox"/> Inspection Incomplete
<input type="checkbox"/> Crushed/Crimped.	<input type="checkbox"/> Burrs	<input type="checkbox"/> Instructions Incomplete/Unclear
<input type="checkbox"/> Cuffs	<input type="checkbox"/> Contamination	<input type="checkbox"/> Maintenance
<input type="checkbox"/> Heat Treat	<input type="checkbox"/> Countersink	<input type="checkbox"/> Mislabeled
<input type="checkbox"/> Inspection Strip in Tube	<input type="checkbox"/> Cut Too Short	<input type="checkbox"/> Misread
<input type="checkbox"/> Ripples in Bend	<input type="checkbox"/> Drill Holes	<input type="checkbox"/> Offset
<input type="checkbox"/> Torque Waves in Extrusion	<input type="checkbox"/> Drawing	<input type="checkbox"/> Out of Calibration
<input type="checkbox"/> Turning Sequence	<input type="checkbox"/> Finish	<input type="checkbox"/> Out of Sequence
<input type="checkbox"/> Wave/Twist in Tube	<input type="checkbox"/> Folio	<input type="checkbox"/> Outside Dimensions
		<input type="checkbox"/> Ovalized
		<input type="checkbox"/> Over/Under tolerance
		<input type="checkbox"/> Part Incorrect
		<input type="checkbox"/> Part Lost/Missing
		<input type="checkbox"/> Part Moved
		<input type="checkbox"/> Positioned Wrong
		<input type="checkbox"/> Power Loss/Surge
		<input type="checkbox"/> Pressure/Forced
		<input type="checkbox"/> Temperature/Cure
		<input type="checkbox"/> Weld
		<input type="checkbox"/> Wrong Stock Pulled
		<input type="checkbox"/> Other

**Work Order ID 89903****\*89903\***

Page 2

Item ID: D4709-1

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID: PRELIM

Stop **\*NS2\***

Item Name: Spring Clip

Start Date: 9/12/12 Start Qty: 25.00

**\*25\***

Cust Item ID:

Required Date: 9/28/12 Req'd Qty: 25.00

**\*25\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
140	Identify as per dwg & Stock Location: _____	0.00							
<b>*140*</b>									
Packaging	Memo	0.00							
Packaging									
150	QC21- Final Inspection - Work Order Release	0.00							
<b>*150*</b>									
QC	Memo	0.00							
Quality Control									

12/10/31

U12.10.01

POSITIVE RECALL

EFFECTIVE DATE 12/10/12 AUTH DATE 12/10/12

NCR: Yes / No

**WORK ORDER NON-CONFORMANCE / UPDATE**

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____  Part No. _____  NCR No. _____	<b>DISPOSITION</b>  Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/> Work Order Update <input type="checkbox"/>	<b>AGAINST DEPARTMENT/PROCESS</b>  <table style="width: 100%;"> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Crosstube <input type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coord. <input type="checkbox"/>	Quality <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>	
Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>															
Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coord. <input type="checkbox"/>	Quality <input type="checkbox"/>															
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Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
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Equip/Tooling									
Operator									
Material									
Setup									
Other									
Process									
Supplier									
Training									
Unapproved									

**FAULT CATEGORY**

Landing Gear	General	Other
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		<input type="checkbox"/> Positioned Wrong
		<input type="checkbox"/> Power Loss/Surge
		<input type="checkbox"/> Pressure/Forced
		<input type="checkbox"/> Temperature/Cure
		<input type="checkbox"/> Weld
		<input type="checkbox"/> Wrong Stock Pulled
		<input type="checkbox"/> Other

# Picklist Print

September-12-12 11:39:46 AM

Page 1

Work Order ID: 89903

Parent Item: D4709-1

Parent Item Name: Spring Clip

Start Date: 9/12/12

Required Date: 9/28/12

Start Qty: 25.00

Required Qty: 25.00

Comments: IPP REV:A 12.09.11 NEW ISSUE DD VERF:JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D4709-1P Spring Clip		Purchased	No			120	Each	0.0000	1	25		9/12/12	(25)

NCR: Yes / No

## WORK ORDER NON-CONFORMANCE / UPDATE

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____  Part No. _____  NCR No. _____	<b>DISPOSITION</b>  Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/> Work Order Update <input type="checkbox"/>	<b>AGAINST DEPARTMENT/PROCESS</b>  <table style="width: 100%;"> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Crosstube <input type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coord. <input type="checkbox"/>	Quality <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>	
Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>															
Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coord. <input type="checkbox"/>	Quality <input type="checkbox"/>															
Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>															
Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>																

Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Doc/Data <input type="checkbox"/>									
Equip/Tooling <input type="checkbox"/>									
Operator <input type="checkbox"/>									
Material <input type="checkbox"/>									
Setup <input type="checkbox"/>									
Other <input type="checkbox"/>									
Process <input type="checkbox"/>									
Supplier <input type="checkbox"/>									
Training <input type="checkbox"/>									
Unapproved <input type="checkbox"/>									

### FAULT CATEGORY

<b>Landing Gear</b> <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped. <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube	<b>General</b> <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio	<input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions  <input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge  <input type="checkbox"/> Pressure/Forced <input type="checkbox"/> Temperature/Cure <input type="checkbox"/> Weld <input type="checkbox"/> Wrong Stock Pulled  <input type="checkbox"/> Other _____ _____ _____ _____
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**D119-827-011 PEDAL LOCKOUT (Augusta Pedal Lockout)**

ITEM/LEVEL	QTY	PART NO.	DESCRIPTION	UNIT COST	SUPPLIER	QUOTES/DELIVERY	COMMENT
1	1	D4704-041	Expandable Pin Assy				
1.1	2	D4704-043	Expandable Pin, Modified				
1.1.1	1	D4711-1 (DSC)	Expandable Pin	114.68	McMaster p/n 97787A661	3-5 days (if in stock)	
1.1.2	1	D4704-1	Handle				
1.2	1	D4708-1	Lanyard	3.48	Lexco Cable	For qty 25 / Ref: Quote #0151711	
1.3	2	D4709-1	Spring Clip <i>GFI</i>	18.13	Virtucom Metals	For qty 50 / Ref: Quote #00006176	
1.4	4	MS20613-4C8	Rivet				
2	2	D4703-041	Lock Pin Assy				
2.2	1	D4703-043	Lock Pin Base				
2.2.1	1	D4703-1	Lock Pin Base				
2.2.2	2	MS21209-F4-15	Threaded Insert				
2.3	1	D4705-1 (DSC)	Quick Release Pin	51.43	Monroe Engineering	For qty 25 / Ref: Quote #005388	<b>** On Order ** / Chantal</b>
3	1	D4710-1	Spacer				
4	8	NAS1149D0463J	Washer				
5	2	MS14144L4	Nut				
6	2	NAS6604D16	Bolt				
7	2	AN4-11A	Bolt				
8	2	MS24665-153	Cotter Pin				
9	2	NAS1149D0416J	Washer				

NCR: Yes / No

**WORK ORDER NON-CONFORMANCE / UPDATE**

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

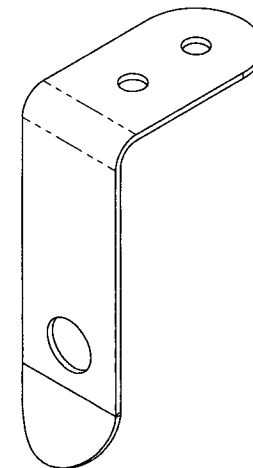
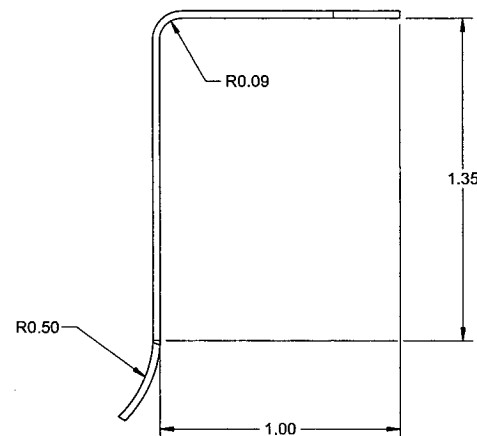
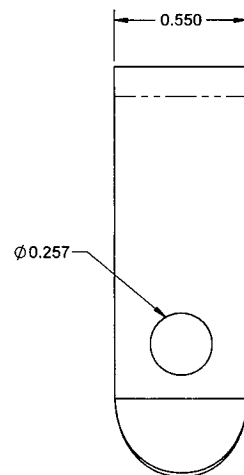
QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____  Part No. _____  NCR No. _____				<b>DISPOSITION</b>  Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/> Work Order Update <input type="checkbox"/>		<b>AGAINST DEPARTMENT/PROCESS</b>  <div style="display: flex; justify-content: space-between;"> <div>           Skid-tube <input type="checkbox"/>            Machining <input type="checkbox"/>            Thermoforming <input type="checkbox"/>            Large Fab <input type="checkbox"/> </div> <div>           Crosstube <input type="checkbox"/>            Small Fab <input type="checkbox"/>            Finishing <input type="checkbox"/>            Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/>            Prod. Eng. Coord. <input type="checkbox"/>            Rec/Store/Packaging <input type="checkbox"/>            Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/>            Quality <input type="checkbox"/>            Other <input type="checkbox"/> </div> </div>					
<b>Root Cause</b>	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector		
Doc/Data <input type="checkbox"/>											
Equip/Tooling <input type="checkbox"/>											
Operator <input type="checkbox"/>											
Material <input type="checkbox"/>											
Setup <input type="checkbox"/>											
Other <input type="checkbox"/>											
Process <input type="checkbox"/>											
Supplier <input type="checkbox"/>											
Training <input type="checkbox"/>											
Unapproved <input type="checkbox"/>											

FAULT CATEGORY				
<b>Landing Gear</b> <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube	<b>General</b> <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio	<input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions	<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge	<input type="checkbox"/> Pressure/Forced <input type="checkbox"/> Temperature/Cure <input type="checkbox"/> Weld <input type="checkbox"/> Wrong Stock Pulled <input type="checkbox"/> Other



also 9903



PRELIMINARY ISSUE

12.09.04

**D4709-1 SPRING CLIP**

**NOTES:**

- 1) MATERIAL: MAKE FROM D4709-1F
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
POWDER COAT "COLOR" (4.3.5.X) PER DART QSI 005 4.3
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: IDENTIFY WITH DART P/N "D4709-1" USING FINE POINT PERMANENT INK MARKER
- 7) WEIGHT: 0.01 lbs

PA1	PROTOTYPE RELEASE	RP	12.09.04
REV.	DESCRIPTION	BY	DATE
DESIGN	RP	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
DRAWN	RP		
CHECKED		DRAWING NO.	REV. PA1
MFG. APPR.		<b>D4709</b>	SHEET 1 OF 2
APPROVED		TITLE	SCALE
DE APPR.		<b>SPRING CLIP</b>	NTS
DATE	12.09.04	COPYRIGHT © 2012 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

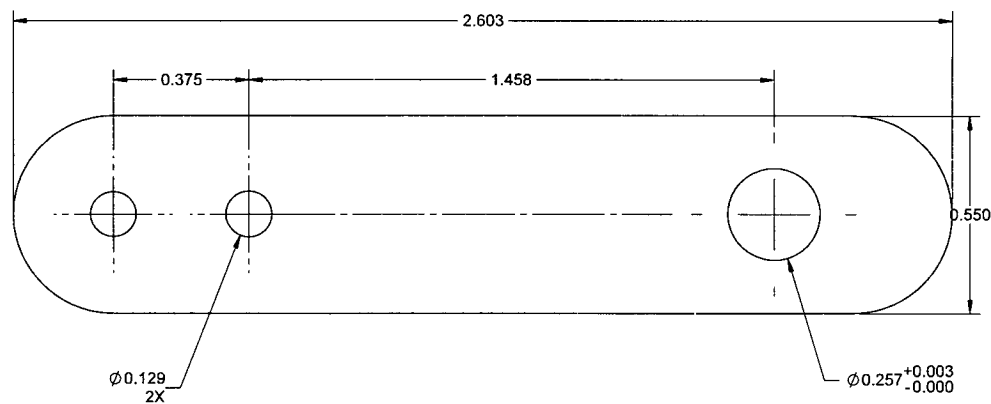
NCR: Yes / No

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Equip/Tooling <input type="checkbox"/>											
Operator <input type="checkbox"/>											
Material <input type="checkbox"/>											
Setup <input type="checkbox"/>											
Other <input type="checkbox"/>											
Process <input type="checkbox"/>											
Supplier <input type="checkbox"/>											
Training <input type="checkbox"/>											
Unapproved <input type="checkbox"/>											
<b>FAULT CATEGORY</b>											
<b>Landing Gear</b> <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube			<b>General</b> <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio			<input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions			<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge  <input type="checkbox"/> Pressure/Forced <input type="checkbox"/> Temperature/Cure <input type="checkbox"/> Weld <input type="checkbox"/> Wrong Stock Pulled  <input type="checkbox"/> Other		



**D4709-1F SPRING CLIP**

**NOTES:**

- 1) MATERIAL: STAINLESS SPRING STEEL PER AISI 410 OR SAE 51410, 0.030 THICK
- 2) FINISH: NONE
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: NONE
- 7) WEIGHT: N/A

DESIGN	RP	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
DRAWN	RP		
CHECKED		DRAWING NO.	REV. PA1
MFG. APPR.		<b>D4709</b>	SHEET 2 OF 2
APPROVED		TITLE	SCALE
DE APPR.		<b>SPRING CLIP</b>	NTS
DATE	12.09.04	<small>COPYRIGHT © 2012 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

*W/O 88842 89903*

NCR: Yes / No

**WORK ORDER NON-CONFORMANCE / UPDATE**

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____  Part No. _____  NCR No. _____	<b>DISPOSITION</b>  Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/> Work Order Update <input type="checkbox"/>	<b>AGAINST DEPARTMENT/PROCESS</b>  <table style="width: 100%;"> <tr> <td>Skid-tube <input type="checkbox"/></td> <td>Crosstube <input type="checkbox"/></td> <td>Water Jet <input type="checkbox"/></td> <td>Engineering <input type="checkbox"/></td> </tr> <tr> <td>Machining <input type="checkbox"/></td> <td>Small Fab <input type="checkbox"/></td> <td>Prod. Eng. Coord. <input type="checkbox"/></td> <td>Quality <input type="checkbox"/></td> </tr> <tr> <td>Thermoforming <input type="checkbox"/></td> <td>Finishing <input type="checkbox"/></td> <td>Rec/Store/Packaging <input type="checkbox"/></td> <td>Other <input type="checkbox"/></td> </tr> <tr> <td>Large Fab <input type="checkbox"/></td> <td>Composite <input type="checkbox"/></td> <td>Supplier <input type="checkbox"/></td> <td></td> </tr> </table>	Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>	Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coord. <input type="checkbox"/>	Quality <input type="checkbox"/>	Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>	Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>	
Skid-tube <input type="checkbox"/>	Crosstube <input type="checkbox"/>	Water Jet <input type="checkbox"/>	Engineering <input type="checkbox"/>															
Machining <input type="checkbox"/>	Small Fab <input type="checkbox"/>	Prod. Eng. Coord. <input type="checkbox"/>	Quality <input type="checkbox"/>															
Thermoforming <input type="checkbox"/>	Finishing <input type="checkbox"/>	Rec/Store/Packaging <input type="checkbox"/>	Other <input type="checkbox"/>															
Large Fab <input type="checkbox"/>	Composite <input type="checkbox"/>	Supplier <input type="checkbox"/>																

Root Cause	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Doc/Data									
Equip/Tooling									
Operator									
Material									
Setup									
Other									
Process									
Supplier									
Training									
Unapproved									

**FAULT CATEGORY**

Landing Gear	General	Other
<input type="checkbox"/> Bending	<input type="checkbox"/> Bend	<input type="checkbox"/> Grain
<input type="checkbox"/> Centre Not Concentric to O/S	<input type="checkbox"/> BOM/Route	<input type="checkbox"/> Hardware
<input type="checkbox"/> Cracks	<input type="checkbox"/> Broken/Damaged	<input type="checkbox"/> Inspection Incomplete
<input type="checkbox"/> Crushed/Crimped.	<input type="checkbox"/> Burrs	<input type="checkbox"/> Instructions Incomplete/Unclear
<input type="checkbox"/> Cuffs	<input type="checkbox"/> Contamination	<input type="checkbox"/> Maintenance
<input type="checkbox"/> Heat Treat	<input type="checkbox"/> Countersink	<input type="checkbox"/> Mislabeled
<input type="checkbox"/> Inspection Strip in Tube	<input type="checkbox"/> Cut Too Short	<input type="checkbox"/> Misread
<input type="checkbox"/> Ripples in Bend	<input type="checkbox"/> Drill Holes	<input type="checkbox"/> Offset
<input type="checkbox"/> Torque Waves in Extrusion	<input type="checkbox"/> Drawing	<input type="checkbox"/> Out of Calibration
<input type="checkbox"/> Turning Sequence	<input type="checkbox"/> Finish	<input type="checkbox"/> Out of Sequence
<input type="checkbox"/> Wave/Twist in Tube	<input type="checkbox"/> Folio	<input type="checkbox"/> Outside Dimensions
		<input type="checkbox"/> Ovalized
		<input type="checkbox"/> Over/Under tolerance
		<input type="checkbox"/> Part Incorrect
		<input type="checkbox"/> Part Lost/Missing
		<input type="checkbox"/> Part Moved
		<input type="checkbox"/> Positioned Wrong
		<input type="checkbox"/> Power Loss/Surge
		<input type="checkbox"/> Pressure/Forced
		<input type="checkbox"/> Temperature/Cure
		<input type="checkbox"/> Weld
		<input type="checkbox"/> Wrong Stock Pulled
		<input type="checkbox"/> Other



Dart Aerospace Ltd.  
1270 Aberdeen Street  
Hawkesbury, ON K6A 1K7  
Tel: 613 632 9577  
Fax: 613 632 1053

## PURCHASE ORDER

Purchase Order ID PO17895

Purchase Order Date 9/12/12

PO Print Date 9/12/12

Page Number 1 of 1

Order From :

VC-GFI001

GFI  
180 AVENUE LABROSSE  
POINTE CLAIRE, QC H9R 1A1  
CA

Contact Name

Vendor Phone 514 630 4877

Vendor Fax 514 630 4849

Vendor Account Nbr

Buyer

Chantal Lavoie

Requisition Nbr

Tax Resale Nbr

10127-2607

Terms

Net 30

Currency

CAD

FOB

Destination-Collect

Ship To :

DART AEROSPACE LTD

1270 ABERDEEN  
HAWKESBURY, ON K6A 1K7  
CANADA

**FAKED**  
9/12/12

Line Nbr	Reference Revision ID Vendor Part Number	Description/ Mfg ID	Req Date/ Taxable	Req Qty/ Unit of Measure	Ship Method	Unit Price	Extended Price
1	D4709-1P	Spring Clip	10/12/12 Yes	25.00 Each	FedEx PI collect	\$27.3700	\$684.25

Special Inst: AS PER DWG D4709 REV. PA1  
B89903

PO Total:

\$684.25

CERTIFICATE OF CONFORMITY  
REQ'D UPON DELIVERY

MATERIAL CERTIFICATION  
REQ'D UPON DELIVERY

Change Nbr: 2

Change Date: 9/12/12

No substitution or deviation without  
consent.  
Certificate of Conformity or Material  
Certification required - YES NO



180 AVENUE LABROSSE  
POINTE-CLAIRE, QC, CANADA H9R 1A1  
TÉL.:(514) 630-4877 - FAX:(514) 630-4849

GFI est une division de Thomas & Betts Fabrication Inc. / GFI is a division of Thomas & Betts Manufacturing Inc.



# BON DE LIVRAISON / SHIPPING MEMO

DATE DE LIVRAISON / SHIPPING DATE				N° DE BON DE LIVRAISON / SHIPPING MEMO NO		PAGE
JR	DI	MO	MO	AN	YR	
15	10	12				0499318
						1/1



VENDU À / SOLD TO

EXPÉDIÉ À / SHIP TO

DART AEROSPACE LTD  
1270 ABERDEEN ST.  
HAWKESBURY, ON  
K6A 1K7

DART AEROSPACE LTD  
1270 ABERDEEN ST.  
HAWKESBURY, ON  
K6A 1K7

CODE DE CLIENT / CUSTOMER CODE		N° DE CONTRAT / JOB NO.	VOTRE N° DE COMMANDE / YOUR PURCHASE ORDER NO.	EXPÉDIÉ PAR / SHIP VIA
DART	GFI-0299	0256588	PO17895	

QUANTITÉ / QUANTITY	N° DE PIÈCE / PART NO.	DESCRIPTION
---------------------	------------------------	-------------

25 D4709-1P

SPRING CLIP

CERTIFICATE OF CONFORMANCE REQ

MFG. JOB# J0256588 - 001 QTY 25 pcs  
DUE DATE: 12 October 2012

EXPÉDITEUR / SHIPPER

N° DE BON DE LIVRAISON / SHIPPING MEMO NO



REÇU PAR / RECEIVED BY

DATE

TOUTES LES RÉCLAMATIONS DOIVENT ÊTRE FAITES EN DEDANS DE 5 JOURS DE LA RÉCEPTION.  
ALL CLAIMS MUST BE MADE WITHIN 5 DAYS OF RECEIPT OF GOODS.

# CERTIFICATE OF COMPLIANCE CERTIFICAT DE CONFORMITE



Membre de / A Member of **Thomas & Betts**

180 LABROSSE AVENUE  
POINTE CLAIRE, QC  
H9R 1A1

**DART AEROSPACE LTD**  
1270 ABERDEEN ST.  
HAWKESBURY, ON K6A 1K7

CERTIFICATE NO. <b>1</b>		OUR JOB NO. <b>J0256588</b>		SHIPPING MEMO <b>0499318</b>		
ITEM	QUANTITY	PURCHASE ORDER	PART NUMBER	REV	NAME	DWG ISSUE
<b>—</b>	<b>25 PCS</b>	<b>PO17895</b>	<b>D4709-1P</b>	<b>PA1</b>	<b>SPRING CLIP</b>	<b>PA1</b>
MATERIAL <b>.030 SST 410 AMS 5504</b>		SUPPLIED BY <b>ROLLED ALLOYS / AK STEEL</b>			MAT. REL. NO. <b>7811069</b>	
PROCESS			PROCESSOR		RELEASE NOTE #	
1	<b>FIRST ARTICLE INSPECTION REPORT ATTACHED</b>			<b>GFI</b>	<b>N/A</b>	
2	<b>REF. GFI MANUFACTURING JOB NUMBER J0256588-001 (25 PCS)</b>			<b>GFI</b>	<b>N/A</b>	
3						
4						
5						
6						
7						
8						
9						

WE HEREBY CERTIFY ALL THE PARTS COVERED BY THIS CERTIFICATE HAVE BEEN MANUFACTURED FROM MATERIAL SUPPLIED ON RELEASE NOTE SHOWN ABOVE AND THAT ALL PARTS HAVE BEEN INDIVIDUALLY INSPECTED AND CONFORM TO THE DRAWINGS AND PURCHASE ORDER REFERENCED ABOVE.

DATE **15 OCTOBER 2012**

G.F.I. Q.C. REP. *[Signature]*



Rolled Alloys  
Certificate of Conformance  
Revised Date 04-04-12  
80561

1

Address:

6810 rue Ernest Cormier  
Laval, QC H7C 2T5  
Phone : 450-665-4848  
Fax: 450-665-5620



2283 Argentina Rd Unit 6  
Mississauga, ON, L5N 5Z2  
Phone : 1-800-521-0332  
Fax : 1-905-363-0282



19, 7251 - 67 Street  
Edmonton, AB, T6B 3N3  
Phone : 1-866-469-9469  
Fax : 1-780-469-9494



ROLLED ALLOYS - CANADA, INC.

## CERTIFICATE OF CONFORMANCE

### 1. GENERAL INFORMATION:

SHIP DATE:	9/19/12		
SOLD TO:	GFI INC.	SHIP TO:	GFI INC.
180 AVENUE LABROSSE		180 AVENUE LABROSSE	
POINTE-CLAIRE, QC, H9R 1A1		POINTE-CLAIRE, QC, H9R 1A1	

### 2. ORDER INFORMATION:

CUSTOMER PO #:	81233	ROLLED ALLOYS SO #:	4003456LV
MATERIAL DESCRIPTION:	030 SHEET 410	MATERIAL PART NUMBER:	N/A
	Width: 36 Length: 83		
NUMBER OF PIECES:	1		
POUNDS/U. OF M.:	24 LBS	HEAT NUMBER:	7811069
SPECIFICATIONS:	AMS 5504M		

### 3. CERTIFICATION INFORMATION:

☒ Rolled Alloys Canada certifies that the material identified in section 2. and all required documentation supplied with said material conforms to the requirements stated in the customer's purchase order and MTR supplied.

☐ Additional specific customer requirements if applicable.

☐ Additional specific customer requirements if applicable.

CERTIFIED BY: Denis Haman

TITLE: Quality Assurance Manager

SIGNATURE:

*[Signature]*

DATE: 09-24-12

\*All printed copies of this document are uncontrolled unless issued by  
Quality Assurance as a controlled copy.





AK Steel Corporation  
Metallurgical Test Report  
Coshocton Works  
17400 State Route 16  
Coshocton, OH 43812 U.S.A.

Page 1

Load No. 7348093  
Srn No. 7348093

250611

1025

CUSTOMER

UNITED PERFORMANCE METALS  
3475 SYMMES ROAD  
HAMILTON, OH 45015

SHIP

UNITED PERFORMANCE METALS  
O'NEAL PERFORMANCE METALS  
METAL PROCESSING DIVISION  
3475 SYMMES ROAD  
HAMILTON, OH 45015

MILL ORDER NO.  
271940-1907

PROCESSOR ORDER NO.  
01019274

BUYERS ORDER NO.  
01019274

PART NO.  
13538

ENGLISH UNITS --PRODUCT-- METRIC UNITS  
0300 NOM 36.0000 X COIL

SKID ID	PIECE	HEAT	PARENT LIFT ID	NET WEIGHT
SKD981251	1	7811069	656400-08	19,020 LBS. 8,627 KG.
TOTAL SKIDS	TOTAL PIECES			TOTAL NET WEIGHT
1	1			19,020 LBS. 8,627 KG.

L-Ladle Analysis of Heat

P-Product Analysis of Parent Coil

### CHEMICAL ANALYSIS

ID	C	MN	P	S	SI	CR	NI	MO	N	CU	AL	SN				
L 7811069	.14	.39	.027	.005	.28	11.84	.16	.02	.008	.15	.002	.004				

SHIPPING DATE: 11/02/2011

REMARKS

THIS MATERIAL WAS MELTED AND MANUFACTURED IN THE U.S.A. (DFARS COMPLIANT).  
NO INTENTIONAL ADDITIONS OF MERCURY OR MERCURY COMPOUNDS, RADIUM, ALPHA  
SOURCE, AND LOW MELTING ALLOYS OR ELEMENTS CAPABLE OF FORMING LOW MELTING  
ALLOYS WERE MADE THROUGHOUT THE PROCESSING OF THIS MATERIAL.  
COILED PRODUCTS CONTAIN NO WELDS  
SOLUTION ANNEALED PER ASTM A 480 SECTION 15.4  
AT MINIMUM TEMPERATURE TO MEET MECHANICAL AND  
BENDING PROPERTY REQUIREMENTS  
STEELMAKING PROCESS - EAF MELTED, AOD REFINED, CONTINUOUS CAST SLABS

### PRODUCT DESCRIPTION

CR SHT TYPE 410 STAINLESS #2D FINISH SLIT EDGE \* AMS 5504M \* ASTM A 240-11 UNS S41000 \* UPM-410 06-04-08

PARENT LIFT ID	POS	DIR (L, T, D)	COND	% ELONG	ELONG METHOD	ELONG GAUGE LENGTH	TENSILE STRENGTH (KSI)	Y.S. 2% OFFSET (KSI)	ROCKWELL HARDNESS Tail	ROCKWELL HARDNESS Front
656400-08	T	T	A.S.T.M	31.0	MEASURED	2 Inch	75	48.7	BW 79	BW 77

ROLLED ALLOYS QUALITY ASSURANCE

APPROVED

DATE

12/1/11

REVIEWED BY Q.C.

Date 11/31 by T1

\*\*\* CONTINUED ON NEXT PAGE \*\*\*

250611

1025



**AK Steel Corporation**  
**Metallurgical Test Report**  
**Coshocton Works**  
**17400 State Route 16**  
**Coshocton, OH 43812 U.S.A.**

Page 2

Load No. 7348093  
Srn No. 7348093

C  
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E  
R

UNITED PERFORMANCE METALS  
3475 SYMMES ROAD  
HAMILTON, OH 45015

S  
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O

UNITED PERFORMANCE METALS  
O'NEAL PERFORMANCE METALS  
METAL PROCESSING DIVISION  
3475 SYMMES ROAD  
HAMILTON, OH 45015

MILL ORDER NO. 271940-1907  
PROCESSOR ORDER NO. 01019274  
BUYERS ORDER NO. 01019274

PART NO.  
13538

ENGLISH UNITS --PRODUCT-- METRIC UNITS  
.0380 NOM 36.0000 X COIL

PARENT LIFT ID	POS	DIR (L, T, D)	COND	BEND 180 IT	GRAIN SIZE ASTM E112	HRND 1750F 30MIN AC						
656400-08	T		A.S.T.M	PASS	12.00	C 42.0						
656400-08	F		A.S.T.M	PASS	11.50	C 42.0						

THE CHEMICAL ANALYSIS AND PHYSICAL OR MECHANICAL TESTS REPORTED ABOVE ARE CORRECT  
AS CONTAINED IN THE RECORDS OF THE CORPORATION

ALL TESTING IS DONE IN ACCORDANCE WITH A.S.T.M. STANDARDS UNLESS OTHERWISE NOTED

AK Steel Corporation

M00C0000 3/06

Program Version LAM35B 1.00

THIS CERTIFIED TEST REPORT HAS BEEN DELIVERED TO A CONSIGNEE OF MATERIAL PURCHASED FROM AK  
Steel Corporation. TO AVOID THE POSSIBILITY OF ITS MISUSE ON DELIVERY OF THE REPORT TO A  
THIRD PARTY IT MUST BE RE-CERTIFIED BY AND UNDER THE NAME OF SUCH CONSIGNEE

SIGNED

*Eric Raymond*  
ERIC RAYMONT  
APPLICATION ENGINEER

DATE 11/02/2011 TIME 00:35 PM

250611  
2825

RA TRACER # 250011

285

**STORK**  
Materials Technology

Stork Materials Testing & Inspection

Material Testing and Non-Destructive Testing

Contact: Tom Bauer  
United Performance Metals  
P.O. Box 64

MIAMIVILLE, OH 45147

15062 Bolsa Chica  
Huntington Beach, CA 92649

Telephone : (714) 892-1961  
Telefax : (714) 892-8159  
Website : www.storksmtd.com

Date: 11/11/2011 P.O. No.: 01019274

W/O No.: UN423-11-04-50322-1

**TEST CERTIFICATE — EAR-CONTROLLED DATA**

Type:	410
Gauge:	.0300
Heat No.:	7811069
Mill Source:	AK STEEL
Tag No.:	1254808
Spec:	AMS 5504(M) ASTM A240-11a
Coil Width:	36

**CHEMICAL ANALYSIS**

Element		Result %	Min %	Max %
C	=	0.15	0.00	0.15
Mn	=	0.39	0.00	1.00
Si	=	0.27	0.00	1.00
P	=	0.027	0.000	0.040
S	=	0.005	0.000	0.030
Cr	=	11.81	11.50	13.50
Ni	=	0.15	0.00	0.75
Mo	=	0.04	0.00	0.50
Al	=	0.01	0.00	0.05
Cu	=	0.14	0.00	0.50
Sn	=	0.01	0.00	0.05
N	=	0.01	0.00	0.08
Fe	=	Balance	Balance	Balance

11/10/11

Chemical Analysis performed by Optical Emission per SOP 2.02, Revision 12  
Carbon and Sulfur by Combustion per SOP 7.00, Revision 7  
Nitrogen by Fusion per SOP 13.00, Revision 5

REVIEWED BY Q.C.

Date 11/14/11 By JS

Respectfully submitted

Kelly Nguyen  
Kelly Nguyen

Senior Quality Administrator

15062 Bolsa Chica, Huntington Beach, CA 92649  
(714) 892-1961 ph • (714) 892-8150 fax • www.storksmtd.com

The information contained in this certification represents only the material submitted and is certified only for the quantities tested. Reproduction except in full is reserved pending written approval. The recording of false, fictitious, or fraudulent statements or entries on the certificate may be punishable as a felony under federal law. All testing was performed in a mercury free environment.

All testing performed in accordance with the latest edition of the applicable ASTM, or other Federal Test Method in effect at the time of test.

RA TRACER # 2500 V

**STORK**  
Materials Technology

Stork Materials Testing & Inspection

Date: 11/11/2011 P.O. No.: 01019274 W/O No.: UNI423-11-04-50322-1  
EAR-CONTROLLED DATA

**HEAT TREAT**

Material: 410

Samples were solution treated by heating to 1750 ° (+/-10°F), and soaked at temp for thirty (30) minutes, then cooled in air to room temperature.

TENSILE (AS REC'D)							
Test Method:	ASTM A 370-10						
Sample No.	Tensile Strength		Yield Strength At	Elongation	Width	Thick	Area
	Min (ksi)	Max (ksi)	0.2% Offset Min. (ksi)	In 2.0" Min. (%)	(in)	(in)	(in <sup>2</sup> )
Requirements :	65	95	30	12.0			
TRANS.	72.5		48.3	33.0	0.503	0.0305	0.0153

**HARDNESS (AS REC'D)**

Requirement: 96 HRBW (Max.)

Test Method: ASTM A 370-10

Each hardness result is an average of at least three readings.

Sample

1

84.3 HR15T

Result (HRBW)

73 HRBW

**HARDNESS (AFTER HEAT TREAT)**

Requirement: 35 - 45 HRC

Test Method: ASTM A 370-10

Each hardness result is an average of at least three readings.

Sample

1

Result (HRC)

39 HRC

**BEND**

Test Method: ASTM E 290-09

Material Thickness: 0.0305"

1 TRANSVERSE sample was cold bent 180 degrees around a mandrel equal to 1X the nominal thickness. The sample was then examined for cracks and other visible defects. The specimen did not show evidence of cracks.  
1) ACCEPTABLE

Respectfully submitted

*Kelly Nguyen*  
Kelly Nguyen

Senior Quality Administrator

15082 Bolsa Chica, Huntington Beach, CA 92649  
(714) 892-1961 ph • (714) 892-8159 fax • www.storksmtl.com

The information contained in this certification represents only the material submitted and is certified only for the quantities tested. Reproduction except in full is reserved pending written approval. The recording of false, fictitious, or fraudulent statements or entries on the certificate may be punishable as a felony under federal law. All testing was performed in a mercury free environment.

All testing performed in accordance with the latest edition of the applicable ASTM, or other Federal Test Method in effect at the time of test.

RA TRACER # 250611

585

**STORK**  
Materials Technology

Stork Materials Testing & Inspection

Date: 11/11/2011 P.O. No.: 01019274 W/O No.: UNI423-11-04-50322-1  
EAR-CONTROLLED DATA

**Grain Size Determination**

Qty Tested: 1

Etchant used: Vilella's Reagent

Requirements: ASTM # 5.0 or finer

Sectioning, mounting, and polishing was done in accordance with ASTM E-3, and then etched in order to reveal the grain structure in accordance with ASTM E-112. Results are as follows:

Average ASTM grain size is: 9.5

A2LA Testing Cert# 0093.01 & 0093.02

Rolls Royce Vendor Code 108900

GE Vendor Code T4707-S400 Issued: 10/10/08, GE S-1000 Issued 08/01/2011

Tested in Accordance with PWA Lab Manual F-23

Nadcap approved per AC7101. Last audit date 09/30/2010. Nadcap certificate is available at [www.eAuditNet.com](http://www.eAuditNet.com) - Online QML (Qualified Manufacturer Listing)

**MATERIAL CONFORMS TO SPECIFICATION**

This document contains technical data whose export and re-export/re-transfer is subject to control by the U.S. Department of Commerce under the Export Administration Act and the Export Administration Regulations. The Department of Commerce's prior written approval is required for the export or re-export/re-transfer of such technical information to any foreign person, foreign entity or foreign organization whether in the United States or abroad.



Customer : ROLLED ALLOYS-QUEBEC

P.O.# 81233 JV

.030" SHEET 410 \*

Tracer No. [250611]

Shpr-C58304

1 PC 36 X 83"

Heat No. [7811069]

Date  
09/18/2012

Certification of Conformance: We certify that the above material meets all requirements of the purchase order and material specifications.

9944 Princeton-Glendale Rd Cincinnati, OH 45246

06

Respectfully submitted

*Kelly Nguyen*  
Kelly Nguyen

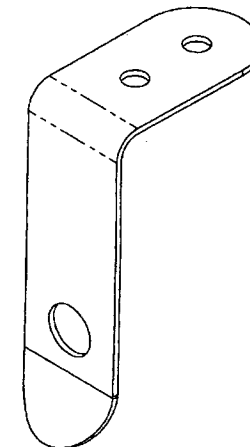
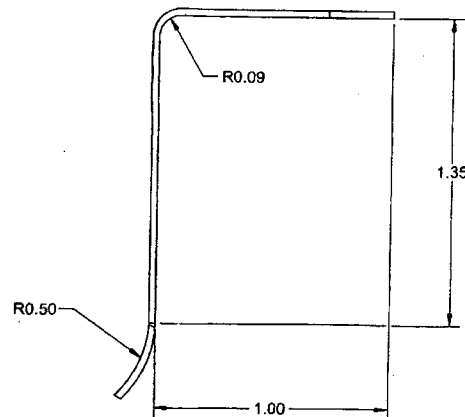
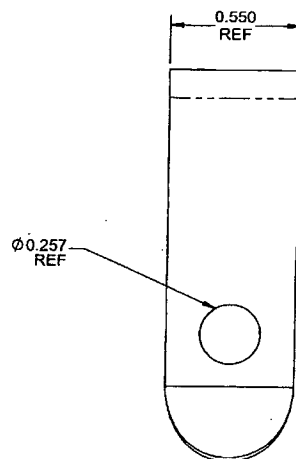
Senior Quality Administrator

15082 Bolsa Chica, Huntington Beach, CA 92649  
(714) 892-1961 ph • (714) 892-8159 fax • [www.storksmti.com](http://www.storksmti.com)

The information contained in this certification represents only the material submitted and is certified only for the quantities tested. Reproduction except in full is reserved pending written approval. The recording of false, fictitious, or fraudulent statements or entries on the certificate may be punishable as a felony under federal law. All testing was performed in a mercury free environment.

All testing performed in accordance with the latest edition of the applicable ASTM, or other Federal Test Method in effect at the time of test.








**D4709-1 SPRING CLIP**

**NOTES:**

- 1) MATERIAL: MAKE FROM D4709-1F
- 2) FINISH: NONE
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: IDENTIFY WITH DART P/N "D4709-1" AND B/N "BXXXXX" PER QSI 044 6.7
- 7) WEIGHT: 0.01 lbs

89903 RELEASE  
2012-10-12  
WMP

A		NEW ISSUE		RP	12.09.19
REV.		DESCRIPTION		BY	DATE
DESIGN	RP	DART AEROSPACE USA, INC. KENT, WA			
DRAWN	RP				
CHECKED	A.P.	DRAWING NO.		REV.	
MFG. APPR.		D4709		SHEET 1 OF 2	
APPROVED		TITLE		SCALE	
DE APPR.		SPRING CLIP		NT	
DATE	12.09.19	COPYRIGHT © 2012 BY DART AEROSPACE USA, INC. THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR REPRODUCED IN ANY FORM OR BY ANY MEANS WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE USA, INC.			

NCR: Yes / No

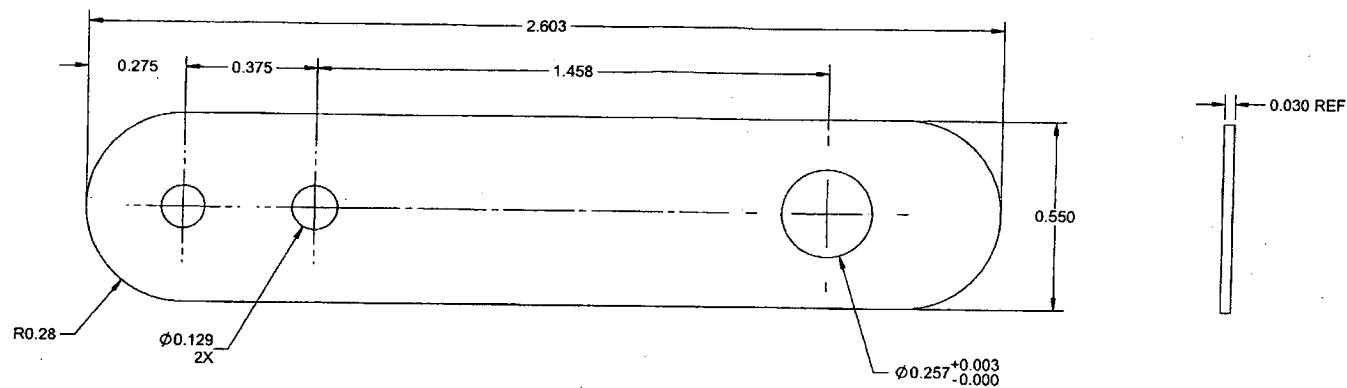
**WORK ORDER NON-CONFORMANCE / UPDATE**

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____  Part No. _____  NCR No. _____				<b>DISPOSITION</b>  Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/> Work Order Update <input type="checkbox"/>		<b>AGAINST DEPARTMENT/PROCESS</b>  <div style="display: flex; justify-content: space-between;"> <div>           Skid-tube <input type="checkbox"/>            Machining <input type="checkbox"/>            Thermoforming <input type="checkbox"/>            Large Fab <input type="checkbox"/> </div> <div>           Crosstube <input type="checkbox"/>            Small Fab <input type="checkbox"/>            Finishing <input type="checkbox"/>            Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/>            Prod. Eng. Coord. <input type="checkbox"/>            Rec/Store/Packaging <input type="checkbox"/>            Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/>            Quality <input type="checkbox"/>            Other <input type="checkbox"/> </div> </div>					
<b>Root Cause</b>	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector		
Doc/Data <input type="checkbox"/>											
Equip/Tooling <input type="checkbox"/>											
Operator <input type="checkbox"/>											
Material <input type="checkbox"/>											
Setup <input type="checkbox"/>											
Other <input type="checkbox"/>											
Process <input type="checkbox"/>											
Supplier <input type="checkbox"/>											
Training <input type="checkbox"/>											
Unapproved <input type="checkbox"/>											
<b>FAULT CATEGORY</b>											
<b>Landing Gear</b> <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube			<b>General</b> <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio			<input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions			<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge  <input type="checkbox"/> Pressure/Forced <input type="checkbox"/> Temperature/Cure <input type="checkbox"/> Weld <input type="checkbox"/> Wrong Stock Pulled  <input type="checkbox"/> Other		





**D4709-1F SPRING CLIP**

2012-10-12  
MD

**NOTES:**

- 1) MATERIAL: STAINLESS SPRING STEEL PER AISI 410 OR SAE 51410, 0.030 THICK
- 2) FINISH: NONE
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: NONE
- 7) WEIGHT: N/A

DESIGN	RP	<b>DART AEROSPACE USA, INC.</b> KENT, WA	
DRAWN	RP		
CHECKED	<i>AP</i>	DRAWING NO. D4709	REV. A
MFG. APPR.	<i>MD</i>	SHEET 2 OF 2	
APPROVED	<i>MD</i>	TITLE	SCALE
DE APPR.	<i>MD</i>	SPRING CLIP	NTS
DATE	12.09.19	<small>COPYRIGHT © 2012 BY DART AEROSPACE USA, INC. THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE USA, INC.</small>	

NCR: Yes / No

**WORK ORDER NON-CONFORMANCE / UPDATE**

DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order: _____  Part No. _____  NCR No. _____				<b>DISPOSITION</b>  Rework <input type="checkbox"/> Scrap <input type="checkbox"/> Use-as-is <input type="checkbox"/> Work Order Update <input type="checkbox"/>		<b>AGAINST DEPARTMENT/PROCESS</b>  <div style="display: flex; justify-content: space-between;"> <div>           Skid-tube <input type="checkbox"/>            Machining <input type="checkbox"/>            Thermoforming <input type="checkbox"/>            Large Fab <input type="checkbox"/> </div> <div>           Crosstube <input type="checkbox"/>            Small Fab <input type="checkbox"/>            Finishing <input type="checkbox"/>            Composite <input type="checkbox"/> </div> <div>           Water Jet <input type="checkbox"/>            Prod. Eng. Coord. <input type="checkbox"/>            Rec/Store/Packaging <input type="checkbox"/>            Supplier <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/>            Quality <input type="checkbox"/>            Other <input type="checkbox"/> </div> </div>					
<b>Root Cause</b>	Date	Step	Qty	Description of work order update or Non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector		
Doc/Data											
Equip/Tooling											
Operator											
Material											
Setup											
Other											
Process											
Supplier											
Training											
Unapproved											

FAULT CATEGORY				
<b>Landing Gear</b> <input type="checkbox"/> Bending <input type="checkbox"/> Centre Not Concentric to O/S <input type="checkbox"/> Cracks <input type="checkbox"/> Crushed/Crimped <input type="checkbox"/> Cuffs <input type="checkbox"/> Heat Treat <input type="checkbox"/> Inspection Strip in Tube <input type="checkbox"/> Ripples in Bend <input type="checkbox"/> Torque Waves in Extrusion <input type="checkbox"/> Turning Sequence <input type="checkbox"/> Wave/Twist in Tube	<b>General</b> <input type="checkbox"/> Bend <input type="checkbox"/> BOM/Route <input type="checkbox"/> Broken/Damaged <input type="checkbox"/> Burrs <input type="checkbox"/> Contamination <input type="checkbox"/> Countersink <input type="checkbox"/> Cut Too Short <input type="checkbox"/> Drill Holes <input type="checkbox"/> Drawing <input type="checkbox"/> Finish <input type="checkbox"/> Folio	<input type="checkbox"/> Grain <input type="checkbox"/> Hardware <input type="checkbox"/> Inspection Incomplete <input type="checkbox"/> Instructions Incomplete/Unclear <input type="checkbox"/> Maintenance <input type="checkbox"/> Mislabeled <input type="checkbox"/> Misread <input type="checkbox"/> Offset <input type="checkbox"/> Out of Calibration <input type="checkbox"/> Out of Sequence <input type="checkbox"/> Outside Dimensions	<input type="checkbox"/> Ovalized <input type="checkbox"/> Over/Under tolerance <input type="checkbox"/> Part Incorrect <input type="checkbox"/> Part Lost/Missing <input type="checkbox"/> Part Moved <input type="checkbox"/> Positioned Wrong <input type="checkbox"/> Power Loss/Surge  _____ _____ _____	<input type="checkbox"/> Pressure/Forced <input type="checkbox"/> Temperature/Cure <input type="checkbox"/> Weld <input type="checkbox"/> Wrong Stock Pulled  <input type="checkbox"/> Other